

Commissioner for Patents

Attached hereto is a marked-up version of the changes and additions made to the claims by the current amendment. The attached pages are captioned "Version with Markings to Show Changes Made."

Respectfully submitted,
ALEXANDRE A. POLLAK ET AL.

By:



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(Date)

Guy Houle (Reg. No. 24,971)
Agent of Record
OGILVY RENAULT
1981 McGill College Avenue, Suite 1600
Montreal, Quebec, Canada H3A 2Y3
Tel.: (514)847-4321

Encl. - Version with Markings to Show Changes Made



VERSION WITH MARKINGS TO SHOW CHANGES MADE

CLAIMS:

1. (deleted) A multiple slide die casting machine including a base, at least a guideway having side walls and two opposed ends mounted on the base, at least two clamping assemblies guided within the respective ends of the guideway for advancing and retracting slide mold sections towards and away from each other, and an injection system for introducing pressurised casting material into a cavity between the slide mold sections when the slide mold sections are in a molding position in which the slide mold sections are restrained together in a preloaded state, the multiple slide die casting machine comprising:

at least two brackets supported on said base for operatively securing the respective clamping assemblies; and
a reinforcement means for interconnecting said brackets to inhibit deflection of said base and said brackets induced by the force generated by said clamping assemblies for maintaining the preloaded state;

wherein each of said clamping assemblies comprises a clamping mechanism and a shank, said shanks being slidable in one of the ends of the guideway and being connected at a first end to one of the slide mold sections and coupled at a second end to said clamping mechanism, and wherein at least one slide mold section is connected to a respective one of the shanks by a mating engagement and a clamp for quick coupling of the slide mold section with the shank.

2. (deleted) A multiple slide die casting machine as claimed in claim 1 wherein each said slide mold section comprises a mold portion and a mounting plate for connecting said mold portion to a respective one of said shanks.

3. (deleted) A multiple slide die casting machine as claimed in claim 2, wherein said mating engagement is a co-operating keyway and slot.
4. (deleted) A multiple slide die casting machine as claimed in claim 2, wherein said mounting plate are adapted for connecting mold portions of varying dimension configurations to a shank of a given dimension configuration.
5. (deleted) A multiple slide die casting machine as claimed in claim 1, wherein at least one of the slide mold sections has an ejection mechanism for ejecting a molded product out of the slide mold section.
6. (deleted) A multiple slide die casting machine as claimed in claim 5, wherein the ejection mechanism has at least one ejector pin slidably engaged in the slide mold section, the ejector pin emerging into the cavity of the slide mold section when the slide mold sections are retracted away from each other, and retracting into the slide mold when the slide mold sections are advanced toward each other.
7. (deleted) A multiple slide die casting machine as claimed in claim 6, wherein the ejector pin is displaced by an ejector hub slidingly received in a cavity of respective ones of the shanks.
8. (deleted) A multiple slide die casting machine as claimed in claim 7, wherein displacement of the ejector hub is guided by at least one stop pin secured to one of the side walls and abutting against portions of the ejector hub to limit a stroke of displacement thereof.
9. (deleted) A multiple slide die casting machine as claimed in claim 1 wherein said base comprises a base plate for supporting the respective brackets at a first side,

said reinforcement means is a reinforcement member being spaced apart from said base plate to connect said respective brackets at a second side so that the respective clamping assemblies are operatively secured between said base plate and said reinforcement member.

10. (deleted) A multiple slide die-casting machine as claimed in claim 9 wherein said reinforcement member is a flat ring parallel to said base plate.

11. (deleted) A multiple slide die-casting machine as claimed in claim 1 wherein said shank is coupled to said clamping mechanism through a ram and a coupling mechanism.

12. (deleted) A multiple slide die-casting machine as claimed in claim 11 wherein a respective pair of stops are provided between each of said brackets and each of said rams to ensure the precise molding position of the slide mold sections and to permit a substantial portion of the clamping force to be applied to said brackets to achieve pre-loading of said clamping assemblies.

13. (deleted) A multiple slide die-casting machine as claimed in claim 1, wherein respective ones of the shanks have a positive stop for aligning the slide mold section thereon during the mating engagement.

14. (deleted) A multiple slide die-casting machine as claimed in claim 1 wherein each of said clamping mechanisms is adjustably secured to a corresponding one of said brackets to ensure the necessary pressure of the clamping assemblies for maintaining the preloaded state as predetermined.

15. (deleted) A multiple slide die-casting machine as claimed in claim 1 wherein said injection system comprises an injection plunger advanceable and retractable by an hydraulic cylinder, and a control system having a closed

loop control mode for selective use to control an operation of a hydraulic cylinder during an injection cycle from a velocity phase in which a velocity of the injection plunger follows a predetermined profile, to a pressure phase in which a net hydraulic pressure applied to the injection plunger is controlled.

16. (deleted) A multiple slide die casting machine as claimed in claim 15 wherein the control system further has an open loop control mode for selective use to control the operation of the hydraulic cylinder with a pre-set pressure and a flow rate of hydraulic fluid supplied to the hydraulic cylinder.

17. (deleted) A multiple slide die casting machine as claimed in claim 16 wherein the control system comprises a control mode selection valve which is automatically activated to enable the pre-set pressure set on a pressure reducing valve only when the open loop control mode is selected.

18. (deleted) A multiple slide die casting machine as claimed in claim 16 wherein the control system comprises at least a position transducer for detecting a pre-set position of the injection plunger and generating a signal to start a transition from the velocity phase to the pressure phase.

19. (deleted) A multiple slide die casting machine comprising:

____ a base plate;

____ a guide member, defining two guideways crossing and disposed perpendicular to each other, each guideway having side walls and two opposed ends;

____ a respective clamping assembly guided within each of the ends of each guideway for advancing and

retracting a slide mold section towards and away from a centre of the guideway;

an injection system for introducing pressurised casting material into a cavity between the slide mold sections when the slide mold sections are in a molding position in which the slide mold sections are restrained together in a preloaded state;

a respective bracket including a first surface secured to said base plate and a second surface remote from said base plate, operatively securing each of said clamping assemblies between said first and second surfaces thereof; and

interconnecting means for interconnecting said second surfaces of said brackets so that the respective clamping assemblies are operatively secured between said base plate and said interconnecting means and deflection of said base plate and said brackets induced by force generated by said clamping assemblies for maintaining the preloaded state is inhibited;

wherein each of said clamping assemblies comprises a clamping mechanism and a shank having opposed ends, the shank being slidable between the side walls in one of the ends of one guideway, and connected at a first end thereof to one of the slide mold sections and coupled at a second end thereof to the clamping mechanism, and wherein at least one slide mold section is connected to a respective one of the shanks by a mating engagement and a clamp for quick coupling of the slide mold section with the shank.

20. (deleted) A multiple slide die casting machine as claimed in claim 19 wherein each said slide mold section comprises a mold portion and a mounting plate for connecting said mold portion to a respective one of said shanks.

21. (deleted) A multiple slide die casting machine as claimed in claim 20, wherein said mating engagement is a co-operating keyway and slot.
22. (deleted) A multiple slide die casting machine as claimed in claim 20, wherein said mounting plate are adapted for connecting mold portions of varying dimension configurations to a shank of a given dimension configuration.
23. (deleted) A multiple slide die casting machine as claimed in claim 19 wherein said interconnecting means is a flat interconnecting ring.
24. (deleted) A multiple slide die casting machine as claimed in claim 23, wherein respective ones of the shanks have a positive stop for aligning the slide mold section thereon during the mating engagement.
25. (deleted) A multiple slide die casting machine as claimed in claim 23, wherein at least one of the slide mold sections has an ejection mechanism for ejecting a molded product out of the slide mold section.
26. (deleted) A multiple slide die casting machine as claimed in claim 25, wherein the ejection mechanism has at least one ejector pin slidably engaged in the slide mold section, the ejector pin emerging into the cavity of the slide mold section when the slide mold sections are retracted away from each other, and retracting into the slide mold when the slide mold sections are advanced toward each other.
27. (deleted) A multiple slide die casting machine as claimed in claim 26, wherein the ejector pin is displaced by an ejector hub slidingly received in a cavity of respective ones of the shanks.

28. (deleted) A multiple slide die-casting machine as claimed in claim 27, wherein displacement of the ejector hub is guided by at least one stop pin secured to one of the side walls and abutting against portions of the ejector hub to limit a stroke of displacement thereof.

29. (deleted) A multiple slide die-casting machine as claimed in claim 19 wherein said shank is coupled to said clamping mechanism through a ram and a coupling.

30. (deleted) A multiple slide die-casting machine as claimed in claim 29 wherein said coupling comprises a pivotal coupling member adapted to transfer a translation of said clamping mechanism to a translation of said shank and to compensate for any misalignment between aid clamping mechanism and said shank.

31. (deleted) A multiple slide die-casting machine as claimed in claim 29 wherein a respective pair of stops are provided between each of the brackets and each of the rams to ensure the precise molding position of the slide mold sections and to permit a substantial portion of the clamping force to be applied to said brackets to achieve pre-loading of said clamping assemblies.

32. (deleted) A multiple slide die-casting machine as claimed in claim 19 wherein each of said clamping mechanisms is adjustably secured to a corresponding one of said brackets to ensure the desired force generated by the clamping assemblies for maintaining the preloaded state as predetermined.

33. (new) A mold section assembly for a die-casting machine comprising:
a mold section having a cavity portion and
adapted to cooperate with at least another mold section in
a closing action of the die-casting machine to form a

cavity to receive an injection of material for producing a cast part;

a mounting plate secured to the mold section, the mounting plate having connection means so as to be slidingly engaged to a leading end of a shank of the die-casting machine, in a direction generally perpendicular to a direction of translation of the shank in said closing action of the die-casting machine; and

securing means for securing the mounting plate to the shank of the die-casting machine.

34. (new) The mold section assembly according to claim 33, further comprising an ejector plate retained in the mounting plate, the ejector plate having connection means so as to be slidingly engaged with an actuator portion of the shank simultaneously with the sliding engagement of the mounting plate with the shank, the ejector plate having at least one ejector actuatable by the actuator portion of the shank to be displaced into the cavity portion of the mold section to eject the cast part during an opening action of the die-casting machine.

35. (new) The mold section assembly according to claim 33, wherein the securing means is at least one clamp.

36. (new) The mold section assembly according to claim 35, wherein the at least one clamp is fixed to the shank and has a lip portion having a surface slanted with respect to the direction of translation of the shank and to a direction of the sliding engagement between the mounting plate and the shank, so as to prevent movement between the mounting plate and the shank in said directions.

37. (new) The mold section assembly according to claim 33, further comprising an adapter between the mold section and the mounting plate for securing the mold section to the mounting plate such that mold sections of

various sizes can be mounted to a common shank through a common mounting plate.

38. (new) The mold section assembly according to claim 33, wherein the die-casting machine is a multiple-slide die-casting machine.

39. (new) A slide section for a die-casting machine comprising:

a shank mounted to a slide of the die-casting machine and connected to an actuation mechanism of the die-casting machine for being translated with respect to the slide in closing/opening actions of the die-casting machine;

a mounting plate having connection means so as to be slidingly engaged to a leading end of the shank, in a direction generally perpendicular to a direction of translation of the shank in the slide;

a mold section secured to the mounting plate and having a cavity portion, the mold section being adapted to cooperate with at least another mold section in a closing action of the die-casting machine to form a cavity to receive an injection of material for producing a cast part; and

securing means for securing the mounting plate to the shank.

40. (new) The slide section according to claim 39, further comprising an ejector plate retained in the mounting plate, the ejector plate having at least one ejector displaceable into the cavity portion of the mold section to eject the cast part during the opening action of the die-casting machine, and wherein the shank comprises an ejector hub slidably received in an inner cavity of the shank, the ejector hub being connected to the ejector plate simultaneously with the sliding engagement of the mounting

plate with the shank and being actuated so as to displace the ejector for ejecting the cast part.

41. (new) The slide section according to claim 39, wherein the securing means is at least one clamp.

42. (new) The slide section according to claim 41, wherein the clamp is fixed to the shank and has a lip portion having a surface slanted with respect to the direction of translation of the shank and a direction of the sliding engagement between the mounting plate and the shank, so as to prevent movement between the mounting plate and the shank in said directions.

43. (new) The slide section according to claim 39, further comprising an adapter between the mold section and the mounting plate for securing the mold section to the mounting plate such that mold sections of various sizes can be mounted to a common shank through a common mounting plate.

44. (new) The slide section according to claim 39, wherein the die-casting machine is a multiple-slide die-casting machine.

45. (new) A method for installing a mold section assembly on a shank of a die-casting machine, comprising the steps of:

i) providing a mold section assembly having connection means complementary to a leading end of a shank of a die-casting machine;

ii) sliding the connection means of the mold section assembly onto the leading end of the shank in a direction generally perpendicular to a direction of translation of the shank in the die-casting machine; and

iii) securing the mold section assembly to the shank with securing means.

46. (new) The method according to claim 45, further comprising the steps of:

iv) removing the securing means securing the mold section assembly to the shank;

v) sliding the mold section assembly away from the shank in a direction opposite to the direction of sliding engagement between the mold section assembly and the shank, whereby the mold section assembly is removed from the shank.

47. (new) The method according to claim 45 wherein the step ii) includes an engagement of an ejector portion of the mold section assembly with an actuator portion of the shank simultaneously with the sliding engagement of the connection means of the mold section assembly with the leading end of the shank.

48. (new) The method according to claim 45, wherein the die-casting machine is a multiple-slide die-casting machine.

49. (new) The method according to claim 45, wherein the securing means is at least one clamp.